

**Amendments to the Claims**

The following listing of claims replaces all prior versions, and listings, of claims in the application:

- 1 1. (currently amended) A computer implemented method for emulating execution of legacy  
2 instructions, where said legacy instructions have instruction addresses, comprising:  
3 accessing blocks of said legacy instructions, said blocks having block addresses,  
4 storing translations, into a translation store, ~~translation information~~ for each of the legacy  
5 instructions,  
6 storing translation indications, for indicating translated blocks, into an indexing table at  
7 block numbers determined by said block addresses, said storing translation  
8 indications using a subset of block address digits whereby block numbers in said  
9 table are the same for multiple different blocks,  
10 executing translated instructions to emulate said legacy instructions,  
11 where for each of the legacy instructions for each particular legacy instruction of a translated  
12 block having a particular block number in said table, said storing translations step  
13 includes translating the particular legacy instruction into one or more translated  
14 instructions for emulating the particular legacy instruction, and  
15 ~~if the particular legacy instruction is a store instruction, to check the~~  
16 ~~indications in said table for said particular block number to determine~~  
17 ~~if instruction data has been stored for said particular block number,~~  
18 ~~if instruction data has been stored for said particular block number, to check~~  
19 ~~said translation store to determine if instruction data has been~~  
20 ~~modified, and otherwise, if instruction data has not been stored for~~  
21 ~~said particular block number, to bypass said checking.~~

22 if the legacy instruction is not a store instruction, going to said step of  
23 executing translated instructions,  
24 if the legacy instruction is a store instruction, where the store instruction  
25 stores to a particular block with a particular block number in said  
26 table, checking the indications in said table for the particular block  
27 number, and,  
28 if the indications indicate that said particular block has not  
29 been translated, going to said step of executing  
30 translated instructions,  
31 if the indications indicate that said particular block has been  
32 translated, checking said translation store to determine  
33 if legacy instruction data has been modified and if  
34 modified, repeating the step of translating the legacy  
35 instructions and going to said step of executing  
36 translated instructions; and otherwise, if legacy  
37 instruction data has not been modified, going to said  
38 step of executing translated instructions.

1 2. (original) The method of Claim 1 wherein said step of storing translation indications stores  
2 indications for only a subset of all the translated blocks.

1 3. (original) The method of Claim 2 wherein said subset of all the translated blocks is stored in a  
2 cache.

1 4. (canceled).

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1 5. (currently amended) The method of Claim 1 [[4]] wherein said block address digits are  
 2 included in a three digit hexadecimal address field and said subset of block address digits is the  
 3 center digit.

1 6. (original) The method of Claim 1 wherein said legacy instructions are for a legacy system having  
 2 a S/390 architecture.

1 7. (original) The method of Claim 1 wherein said legacy instructions are object code instructions  
 2 compiled/assembled for a legacy architecture.

1 8. (original) The method of Claim 1 wherein said legacy instructions include store instructions for  
 2 modifying instruction code.

1 9. (original) The method of Claim 1 wherein said translation indications include a state field for  
 2 each block number indicating whether the block represented by said block number has been  
 3 modified.

1 10. (currently amended) The method of Claim 1 wherein,  
2 ~~said step of storing translation indications stores indications for only a subset of all the~~  
3 ~~translated blocks and uses a subset of block address digits whereby block numbers~~  
4 ~~in said table are the same for multiple different blocks;~~  
5 said subset of all the translated blocks is stored in a cache,  
6 said translation indications include a state field storing a count for each block number  
7 indicating whether the block represented by said block number has been modified,  
8 said count in a state field is incremented each time a block represented by said block number  
9 has been modified in said cache,  
10 said count in a state field is decremented each time a block represented by said block number  
11 has been removed from said cache,  
12 said ~~bypassing said step of checking step~~ said translation store occurs only when said count  
13 is zero.

1 11. (currently amended) A computer implemented method for dynamic emulation of object code  
2 legacy instructions, where the legacy instructions have instruction addresses determined by  
3 compilation/assembly of source code and where the legacy instructions include self-modifying store  
4 instructions for modifying instruction code, comprising:

5 accessing blocks of said legacy instructions, said blocks having block addresses,  
6 storing translations, into a translation store ~~translation information~~, for each of the legacy  
7 instructions,

8 storing translation indications, for only a subset of all the translated blocks, into an indexing  
9 table at block numbers determined by said block addresses, said storing translation  
10 indications,

11 using a subset of block address digits whereby block numbers in said table  
12 are the same for multiple different blocks,

13 including a state field storing a count for each block number indicating  
14 whether the block represented by said block number has been  
15 modified by self-modifying store instructions,

16 executing translated instructions to emulate said legacy instructions,

17 where for each particular of the legacy instructions of said subset of all the translated blocks  
18 having a particular block number in said table,

19 said storing translations step includes translating the particular legacy  
20 instruction into one or more translated instructions for emulating the  
21 particular legacy instruction,

22 storing said translated instructions in a cache,

23 if the legacy instruction is not a store instruction, going to said step of  
24 executing translated instructions,

25 if the particular legacy instruction is a store instruction, where the store  
26 instruction stores to a particular block with a particular block number

27 in said table, checking the indications in said table for said particular  
28 block number ~~to determine if instruction data has been stored for~~  
29 ~~particular block number, if and,~~

30 if the instruction data has been stored for indications indicate  
31 that said particular block number has not been  
32 translated, going to said step of executing translated  
33 instructions,

34 if the indications indicate that said particular block number  
35 has been translated, checking said translation store to  
36 determine if legacy instruction data has been modified  
37 and if modified, repeating the step of translating the  
38 legacy instructions and going to said step of executing  
39 translated instructions; and otherwise, if instruction  
40 data has not been ~~stored for said particular block~~  
41 ~~number, bypassing said checking:~~ modified, going to  
42 said step of executing translated instructions.

1 12. (currently amended) The method of Claim 11 wherein said count in a state field is incremented  
2 each time a block represented by said block number has been modified in said cache, said count in  
3 a state field is decremented each time a block represented by said block number has been removed  
4 from said cache, said ~~bypassing said step of checking step~~ said translation store occurs only when  
5 said count is zero.

1 13. (original) The method of Claim 11 wherein said legacy code is compiled/assembled for a native  
2 architecture and executes as a guest on a host architecture.

1 14. (original) The method of Claim 13 wherein the native architecture employs CISC instructions  
2 and the host architecture employs RISC instructions.

1 15. (currently amended) A computer system for emulating execution of legacy instructions, where  
2 said legacy instructions have instruction addresses, comprising:

3 a group access unit for accessing blocks of said legacy instructions, said blocks having block  
4 addresses,

5 a translator for translating the legacy instructions to form translated instructions,

6 a translation store for storing ~~translation information for each of the~~ translated legacy  
7 instructions,

8 an execution unit for executing said translated instructions to emulate said legacy  
9 instructions,

10 an index table for storing translation indications [[,]] for indicating translated blocks at block  
11 numbers determined by said block addresses, said index table storing translation  
12 indications using a subset of block address digits whereby block numbers in said  
13 table are the same for multiple different blocks,

14 where for each particular of the legacy instructions of a translated block having a particular  
15 block number in said table, said translation store includes one or more translated  
16 instructions for emulating the legacy instruction, and,

17 ~~to translate the particular legacy instruction into one or more translated~~  
18 ~~instructions for emulating the particular legacy instruction,~~

19 if the legacy instruction is not a store instruction, the computer system goes  
20 to the execution unit for executing said translated instructions,

21 if the particular legacy instruction is a store instruction, ~~to check where the~~  
22 store instruction stores to a particular block with a particular block

23                    number in said table, the computer system checks the indications in  
24                    said table for said particular block number ~~to determine if instruction~~  
25                    ~~data has been stored for said particular block number, and,~~  
26                    if the indications indicate that if instruction data has been  
27                    stored for said particular block number, has not been  
28                    translated, the computer system goes to the execution  
29                    unit for executing said translated instructions,  
30                    if the indications indicate that said particular block to check  
31                    has not been translated, said translation store is  
32                    checked to determine if instruction data has been  
33                    modified and, if modified, the translator repeats  
34                    translating the legacy instructions and the computer  
35                    system goes to the execution unit for executing said  
36                    translated instructions; and otherwise, if instruction  
37                    data has not been ~~stored for said particular block~~  
38                    ~~number, to bypass said checking~~ modified, the  
39                    computer system goes to the execution unit for  
40                    executing said translated instructions.

1        16. (original) The system of Claim 15 wherein said index table stores indications for only a subset  
2        of all the translated blocks.

1        17. (original) The system of Claim 16 including a cache and wherein said subset of all the  
2        translated blocks is stored in said cache.



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18. (canceled).

1 19. (currently amended) The system of Claim ~~18~~ 15 wherein said block address digits are included  
 2 in a three digit hexadecimal address field and said subset of block address digits is the center digit.

1 20. (original) The system of Claim 15 wherein said legacy instructions are for a legacy system  
 2 having a S/390 architecture.

1 21. (original) The system of Claim 15 wherein said legacy instructions are object code instructions  
 2 compiled/assembled for a legacy architecture.

1 22. (original) The system of Claim 15 wherein said legacy instructions include store instructions  
 2 for modifying instruction code.

1 23. (original) The system of Claim 15 wherein said index table includes a state field for each block  
 2 number indicating whether the block represented by said block number has been modified.

- 1 24. (currently amended) The system of Claim 15 wherein,  
2 ~~said index table stores indications for only a subset of all the translated blocks and uses a~~  
3 ~~subset of block address digits whereby block numbers in said table are the same for~~  
4 ~~multiple different blocks;~~  
5 ~~said subset of all the translated blocks;~~  
6 said system includes a cache for storing said subset of all the translated blocks,  
7 said index table includes a state field storing a count for each block number indicating  
8 whether the block represented by said block number has been modified,  
9 said count in a state field is incremented each time a block represented by said block number  
10 has been modified in said cache,  
11 said count in a state field is decremented each time a block represented by said block number  
12 has been removed from said cache,  
13 said ~~bypassing of said checking occurs~~ translation store is checked only when said count is  
14 zero.

1 25. (currently amended) A computer system for dynamic emulation of object code legacy  
2 instructions, where the legacy instructions have instruction addresses determined by  
3 compilation/assembly of source code and where the legacy instructions include self-modifying store  
4 instructions for modifying instruction code, comprising:

5 a group access unit for accessing blocks of said legacy instructions, said blocks having block  
6 addresses,

7 ~~storing into~~ a translation store for storing translation information for each of the legacy  
8 instructions,

9 an index table for storing translation indications, for only a subset of all the translated blocks  
10 at block numbers determined by said block addresses, said index table storing  
11 translation indications,

12 using a subset of block address digits whereby block numbers in said table  
13 are the same for multiple different blocks,

14 and including a state field storing a count for each block number indicating  
15 whether the block represented by said block number has been  
16 modified by self-modifying store instructions,

17 a cache for storing translated instructions,

18 an execution unit for executing said translated instructions to emulate said legacy  
19 instructions,

20 a legacy code translator operating, for each ~~particular of the~~ legacy instruction instructions  
21 of said subset of all the translated blocks having a ~~particular~~ block number in said  
22 table,

23 to translate the ~~particular~~ legacy instruction into one or more translated  
24 instructions for emulating the ~~particular~~ legacy instruction,

25 ~~To to~~ store said translated instructions in a the cache and,

26 if the legacy instruction is not a store instruction, the computer system goes  
27 to said execution unit for executing said translated instructions,  
28 if the particular legacy instruction is a store instruction, to check where the  
29 store instruction stores to a particular block with a particular block  
30 number in said table, the computer system checks the indications in  
31 said table for said particular block number to determine if instruction  
32 data has been stored for said particular block number and,  
33 if the indications indicate that if instruction data has been  
34 stored for said particular block number, has not been  
35 translated, the computer system goes to said execution  
36 unit for executing said translated instructions,  
37 if the indications indicate that said particular block checking  
38 said translation store has been translated, the  
39 computer system checks to determine if instruction  
40 data has been modified; and if modified, the computer  
41 system goes to said translator to repeat operating to  
42 translate the legacy instructions into one or more  
43 translated instructions and the computer system goes  
44 to said execution unit for executing said translated  
45 instructions; and otherwise, if instruction data has not  
46 been modified stored for said particular block number,  
47 to bypass said checking and go to said execution unit  
48 for executing said translated instructions.

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1 26. (currently amended) The system of Claim 25 wherein said count in a state field is incremented  
2 each time a block represented by said block number has been modified in said cache, said count in  
3 a state field is decremented each time a block represented by said block number has been removed  
4 from said cache, said bypass said checking ~~step~~ occurs only when said count is zero.

1 27. (original) The system of Claim 25 wherein said legacy code is compiled/assembled for a native  
2 architecture and executes as a guest on a host architecture.

1 28. (original) The system of Claim 27 wherein the native architecture employs CISC instructions  
2 and the host architecture employs RISC instructions.